

The Nexus between Unemployment and External Sector Variables in Nigeria: An ARDL Approach

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Abstract

This paper examined the impact of external sector variables on unemployment in Nigeria from 1985 to 2022. The study employed the Autoregressive Distributed Lag (ARDL) method in estimating the time series data obtained from the World Development Indicators. The findings of the study were that; exchange rate had mixed effect on UNP in the short run while at 5 percent level while foreign direct investment reduced unemployment rate in the short run. However, in the long run they were found to increase the rate of unemployment in the country at 5 percent significance level. Official development assistance on the other hand, showed no evidence of influence on unemployment in the long run, however, in the short run, it significantly increased the level of unemployment in the country. Following this, the study recommended that, the Nigerian government should make sure that measures are taken to fortify and expand institutions to prevent donor agencies' efforts to combat unemployment from being redirected or siphoned for private gain.

Keywords: *Unemployment rate, External sector, ARDL approach*

1. Introduction

Third-world nations like Nigeria are faced with lots of developmental and economic problems. Unemployment stands out as a major problem in the developing world and can serve as a tool that can foster unrest, crime, and political instability. This view is consistent with the observation of Ewubare and Maeba (2018) who affirmed that rising level of unemployment is usually accompanied by social vices, especially among young people and this threatens the foundation of a nation. They further asserted that Nigeria has a high unemployment rate and added that according to the NBS (2014), unemployment rate increased from under 10% in the early 1980s to 23.9% in 2013. Government initiatives to create jobs, like NEEDS, SEVEN POINT AGENDA, and SURE-P, seem to have had very little success (Oaikhenan & Aigheyisi, 2015). According to data available from the Central Bank of Nigeria (CBN) and the Nigeria Bureau of Statistics (NBS), the nation's unemployment rate has been rising quickly since 2007 (Adzugbele, Eze, Morba, & Nwokocha, 2020).

At both the micro and macro levels, unemployment is a serious issue. Financially speaking, it lowers individual incomes, which lowers household incomes and future savings plans.

Psychologically, it causes people to lose or have low self-esteem and identity, which has an impact on their mental health and diminishes their ability to be productive. Additionally, it causes poverty, which lowers people's capacity to pay for and eat wholesome food, medical care, and shelter. On a larger scale, it results in the depletion of priceless productive resources, which has implications for steady economic expansion and a higher standard of life across the nation. It also raises dependency ratios and redirects money that should go toward social welfare expenditures instead of development (Adzugbele, Eze, Morba, & Nwokocha, 2020).

The state of the Nigerian economy is dire and requires improvement. The economy is still growing slowly and unemployment rate is still high. Many analysts believe that the external sector might be a key factor in the growth of the Nigerian economy (Johnny, Timipere, Krokeme & Markjackson, 2018). The economic exchanges between an economy's citizens and the rest of the world are reflected in the performance of its external sector. Exchange rate, foreign direct investment (FDI), external debt, and official development aid are among the key variables that define the external sector's performance. Countries like Hong Kong, South Korea, and Singapore have leveraged on the external sector to achieve meaningful economic growth (Abubakar, 2021; Okumoko & Amaegberi, 2018). For example, FDI help create employment opportunities through money inflows from developed countries to developing countries. According to the neo-liberal school, a large portion of the required economic fortune can be attained by foreign direct investment. For emerging nations, it can offer vital assistance in modernizing the industrial system. that the nation's economy may grow in terms of money, jobs, and technology through foreign direct investment (Biplob & Siddiqee, 2024; Ugwuegbe, Okorie & John, 2013). Exchange rate is another significant factors that impact unemployment, a study by Zahra and Mehrzad (2016) found that exchange rate has a negative effect on unemployment.

Also, Official development assistance (ODA) plays an especially important role in the development process of many developing countries that are unable to generate enough domestic savings to pursue economic growth. Many developing nations have traditionally looked to other nations for financial assistance. In addition, foreign aid in form of ODA has also been used as a tool of foreign policy, fostering diplomatic and political ties with developing nations and bolstering political and economic stability within existing nations (Andersen, Juel, Ohannesen, & Rijkers, 2020; Parsad, & Inaba, 2021).

To this end, a study that evaluates the effect of the external sector on unemployment in Nigeria becomes appropriate. To our best knowledge there is no study that has tried to examine the general effect of exchange rate, foreign direct investment inflows, and official development assistance received on unemployment rate in Nigeria. Thus, this serves as a potential research gap for the study.

2. Literature Review

2.1. Theoretical Framework

The theoretical framework of this study is hinged on the Thirlwall (1979) Balance of Payment Constrained Growth model. The theory holds that the balance of payments limits a nation's growth rate since an economy cannot expand more quickly than what is consistent with the balance of payments equilibrium, or at the very least, with a sustainable deficit in the balance of payments. Thus, the fundamental tenet of the model is that the long-term rate of economic growth is determined by import and export performance. The only long-term way to finance rising imports brought on by an increase in domestic activity or aggregate demand is to increase foreign exchange earnings from exports of goods and services. As a result, it presumes that imports are only correlated with domestic income and that the trade balance is balanced. To elaborate, Ferreira and Canuto (2003) state that the balance of payments constraint results from the fact that the only elements of aggregate demand that can both boost GDP growth and ease external constraints are export expansion and investment in import substitution. An economy with a favourable balance of payments is better able to grow while keeping its current account balanced.

The reason for the adoption of this theory is that it explains the interaction between an economy and the rest of the world. This interaction can lead to the expansion or contraction of the economy.

2.2. Empirical Review

Several literature exist on the effect of external sector variables on unemployment. In view of this, Atya (2017) investigated the effect of real exchange rate on unemployment in the Egyptian economy during the period 1985-2015. The study employed three channels of effect of real exchange rate on unemployment; these channels were macroeconomic channel, development channel, and labour intensity channel. It used three methods to estimate this relationship. They were Autoregressive Distributed Lag Model (ARDL), Fully Modified OLS (FMOLS), and Dynamic OLS (DOLS). The results revealed that real exchange had a positive and significant effect on unemployment. There was no significant effect of economic openness on unemployment. Furthermore, the correlation between unemployment and the growth was negative and significant. Also, the effect of labour productivity on unemployment was positive and significant.

In another development, Zahra and Mehrzad (2016) investigated the relationship between exchange rate and unemployment in Iran using the annual data of 30 years (from 1981 to 2012). To achieve the objectives of the study, autoregressive econometric model with distributed lag was used to assess the relationship between real exchange rate and unemployment. This model consisted of five main variables, namely unemployment rate, exchange rate, export, import, and gross domestic product. The results of the study demonstrated that economic growth had a significant and positive effect on unemployment. In addition, it was shown that there was a negative relationship between unemployment and exchange rate.

Mustafa and Azizun (2020) examined the impact of foreign direct investment on unemployment in six countries in the Middle East and North Africa, Egypt, Jordan, Lebanon, Morocco, Tunisia,

and Turkey. The study employed panel data for the period from 1990 to 2018, where three economic models were used to examine the impact of FDI on unemployment, male unemployment, and female unemployment, in the long run, using the Fixed Effect Model (FEM) and Random Effect Model (REM), in addition to finding the causal relationship in the short term using Panel VAR (Granger causality tests). The results showed that FDI reduces the unemployment rate, the male unemployment rate, and the female unemployment rate in the long run. The results of the study also revealed that there is no causal relationship in the short term between FDI and unemployment in its various forms, while there is a bidirectional causal relationship between FDI and exports according to the three economic models. This paper is the first of its kind in terms of examining the effect of FDI on unemployment in the six countries as a grouped and a sample of the MENA region.

Biplob and Siddiquee (2024) evaluated the impact of FDI and foreign remittances on unemployment from 1991 to 2020 from Bangladesh's perspective. With the use of EViews 10 version, this study used the ARDL technique to capture the long-run and short-run estimations. The study utilized the unemployment rate as a dependent variable and foreign direct investment (FDI) and foreign remittances as independent factors. The remaining factors include exchange rate, GDP growth, exports, and inflation rate; these are controllable variables. The results of the research show that FDI and foreign remittance have a positive and statistically significant association with unemployment rate in Bangladesh, both in the long run and in the short term.

Adzugbele *et al.* (2020) analyzed the effect of real exchange rate on the rate of unemployment in Nigeria. Time series data spanning from 1983 to 2015 which were sourced from the Central Bank of Nigeria (CBN) and Debt Management Office (DMO) statistical bulletin for 2019 and also the World Development Indicators (WDI) (2019) were used for the analysis. The ARDL bounds testing approach to cointegration was used to analyze the data. The results from the estimations show that real exchange rate has both in the short and long run, led to increase in the rate of unemployment.

3. Methodology

3.1. Research Design/Data Source

The study adopted a quasi-experimental research design. The appeal for this research design was necessitated given that the study relied on secondary data that dealt with dependent and independent variables of which time series data is involved. The data were sourced from World Development Indicators of the World Bank. To have enough observations for long-term inference, the data spanned from 1985 to 2022. The study's variables include exchange rate, foreign direct investment inflows, official development assistance received, and unemployment rate.

3.2. Estimation Strategy and Model Specification

The Autoregressive Distributed Lag (ARDL) method was the empirical strategy used in the study. It was picked for this study primarily because the variables were stationarity at both the level and

first difference. Pesaran, Smith, and Shin (1996b) introduced the ARDL method. Nkoro and Uko (2016) claimed that "where there are multiple cointegrating vectors, the major advantage of ARDL approach lies in its identification of the cointegrating vectors." Also the method's ability to provide both short-term (Error Correction Model) and long-term cointegration among the variables under investigation is yet another significant benefit.

The model used in this research work had the following specifications.

The functional form of the model are as follows:

$$UNP = f(EXR, FDI, ODA) \tag{1}$$

Stated in linear form gives;

$$UNP = b_0 + b_1EXR + b_2FDI + b_3ODA + \mu \tag{2}$$

A priori Expectations: $b_1 > 0, b_2 < 0, b_3 < 0$

Formulating the Autoregressive Distributed Lag (ARDL) long-run model gives;

$$\Delta(UNP)_t = b_0 + b_1(UNP)_t + b_2(EXR)_t + b_3(FDI)_t + b_4(ODA)_t + \sum_{i=1}^n \Delta b_1(UNP)_{t-1} + \sum_{i=1}^n \Delta b_2(EXR)_{t-1} + \sum_{i=1}^n \Delta b_3(FDI)_{t-1} + \sum_{i=1}^n \Delta b_4(ODA)_{t-1} + \mu_{1t} \tag{3}$$

While the short-run Error Correction Model derived from the ARDL model yields;

$$\Delta(UNP)_t = \partial_0 + \partial_1(UNP)_t + \partial_2(EXR)_t + \partial_3(FDI)_t + \partial_4(ODA)_t + \sum_{i=1}^n \Delta \partial_1(UNP)_{t-1} + \sum_{i=1}^n \Delta \partial_2(EXR)_{t-1} + \sum_{i=1}^n \Delta \partial_3(FDI)_{t-1} + \sum_{i=1}^n \Delta \partial_4(ODA)_{t-1} + \Pi ECM + \mu_{2t} \tag{4}$$

Where:

UNP = Unemployment rate; EXR = Exchange rate; FDI = Foreign direct investment inflows; ODA = Official development assistance received; b_0 = *Intercept of the models*; $b_1 - b_3$ = *Slopes of the models respectively*; $b_1 - b_4$ = *Long - run dynamic coefficients*; $\partial_1 - \partial_4$ = *Short-run dynamic coefficients*; μ_t = *Disturbance or error term*; Δ = *First difference operator*; n = *Maximum lag lenght*; Π = *Error correction coefficient*; ECM = *Error correction term with one period lag*; f = *Functional Notaton*.

4. Results and Discussion

4.1. Test of Unit Root

The test of stationarity among the variables of the study was fulfilled using Augmented Dickey Fuller (ADF) method and the result is presented in Table 1.

Table 1: ADF Unit Root Test Results

Variable	ADF Test Stat.	5% Critical Value	P-value	Order of Integration	Test Option	Remark
UNP	-4.614872	-3.580623	0.0051	I(1)	Trend & Intercept	Integrated of order 1
EXR	-4.672385	-3.540328	0.0033	I(1)	Trend & Intercept	Integrated of order 1
FDI	-3.880495	-3.536601	0.0231	I(0)	Trend & Intercept	Integrated of order 0

ODA	-	-3.540328	0.0075	I(0)	Trend & Intercept	Integrated of order 0
	4.348235					

Source: Author's computation from Eviews software, 2024

The result of the stationarity test in Table 1 indicates that at level, FDI and ODA were stationary, meaning they are integrated of order 0. This is because at 5 percent level, their corresponding ADF test statistic values of -3.880495 and -4.348235 are greater than their corresponding critical values of -3.536601 and -3.540328 in absolute terms. This suggests that the respective mean and variance of the series do not vary systematically over time. In contrast, UNP and EXR were not stationary at level but having being transformed, they became stationary at first difference; indicating that the series were integrated of order 1.

4.2. The ARDL Cointegration Analysis

The result of the ARDL bounds cointegration test for long run relationship is given in Table 2.

Table 2: Bounds Cointegration Test Results for Model

Test Statistic	Value	Signif.	I(0)	I(1)	Decision
F-statistic	6.135026	10%	2.37	3.2	Cointegrated
k	3	5%	2.79	3.67	
		2.5%	3.15	4.08	
		1%	3.65	4.66	

Note: K denotes number of explanatory variables

Source: Author's computation from Eviews software, 2024

The result of the bounds cointegration test in Table 2 suggests the evidence of long run relationship between UNP and the regressors. This is owing to the proof that at 5 percent level, the F-statistic value of 6.135026 is greater than the upper-bound, I(1) critical value of 3.67.

4.3. ARDL Regression Analysis

The result of the ARDL long run and short run estimation is presented in Table 3.

Table 3: Results of the Estimation of ARDL Model

Dependent Variable: UNP

Variable	Short run results			
	Coefficient	Std. Error	t-Statistic	Prob.
D(UNP(-1))	0.553091	0.146283	3.780968	0.0018
D(UNP(-2))	0.453131	0.164562	2.753561	0.0148
D(UNP(-3))	0.729564	0.144881	5.035603	0.0001
D(EXR)	0.065328	0.025739	2.538081	0.0227
D(EXR(-1))	0.056039	0.026220	2.137283	0.0495

D(EXR(-2))	-0.023140	0.027489	-0.841790	0.4131
D(EXR(-3))	-0.070950	0.028675	-2.474295	0.0258
D(FDI)	0.393449	0.480534	0.818774	0.4257
D(FDI(-1))	-3.116316	0.688551	-4.525904	0.0004
D(FDI(-2))	-2.279131	0.667568	-3.414081	0.0038
D(FDI(-3))	-1.044506	0.520564	-2.006492	0.0632
D(ODA)	-0.907349	0.537343	-1.688586	0.1120
D(ODA(-1))	1.609405	0.505062	3.186553	0.0061
D(ODA(-2))	1.120000	0.613854	1.824538	0.0881
CointEq(-1)*	-0.960067	0.154020	-6.233391	0.0000
Long run results				
EXR	0.070578	0.011376	6.204235	0.0000
FDI	3.556566	1.412570	2.517799	0.0237
ODA	-2.801344	1.325209	-2.113888	0.0517
R-squared	0.789686			
Adjusted R-squared	0.634718			
Durbin-Watson stat	1.577123			

Source: Author's computation from Eviews software, 2024

The short run result in Table 3 shows that except for the third lag period when EXR had a significant negative effect on UNP at 5 percent level, all other coefficients had positive values. To this end, a significant positive effect was witnessed on UNP in the current period and one-year period lag. This is because, the corresponding probability values of the both periods of 0.0227 and 0.0495 are less than 0.05. This implies that in the short term, both the current and past values of EXR significantly influence unemployment level in Nigeria. The long run result was not any different as UNP yet again witnessed a significant positive impact at 5 percent level. The long run coefficient value of 0.070578 indicates that for every 1 unit increase in EXR, UNP will increase by 0.070578 unit.

In another development, the past values of FDI significantly reduce the level of UNP within the evaluation period. This is because the respective coefficients of the first and second lag periods were associated with probability values of 0.0004 and 0.0038 less than 0.05. However, in the long run, although, evidence of significant effect exists at 5 percent level, the coefficient value of 3.556566 suggests that for every 1 unit increase in FDI, UNP will increase by 3.556566. Further, ODA in the current period had an inverse relationship with UNP, however, it failed to exert any significant influence on UNP at 5 percent level. Nevertheless, in the previous year, evidence of significant positive impact was established following that the probability value (0.0061) of the first lag period is less than 0.05. The long run result was however different as ODA failed to influence changes in the level of unemployment rate under the study period.

The coefficient (-0.960067) of the error correction term is appropriately signed and falls within the acceptance region of $-1 < \text{error term} < 0$. It is also statistically significant at 5 percent level. This

result suggests that when there is a shock to the model, it adjusts with a speed of 96 percent toward long equilibrium. The R-squared of 0.789686 is a testament to the model's goodness of fit. This indicates that variations in the independent variables account for 98.97 percent of the variations in UNP under the evaluation period. Furthermore, Durbin-Watson statistic value of 1.577123 shows that the model is free from the problem of autocorrelation.

4.4. Post-estimation Tests

4.5.1. Serial Correlation LM test, Heteroskedasticity Test, and Ramsey RESET

The results of the Serial Correlation LM test, Heteroskedasticity Test, and Ramsey RESET test are presented in Table 4.

Table 4: Post-estimation Test Results for Model

Breusch-Godfrey serial correlation LM test	F-statistic	1.277839	Prob. F(2,13)	0.3114
	Obs*R-squared	5.585939	Prob. Chi-Square(2)	0.0612
Breusch-Pagan-Godfrey Heteroskedasticity	F-statistic	0.530062	Prob. F(18,15)	0.9000
	Obs*R-squared	13.21855	Prob. Chi-Square(18)	0.7784
Ramsey RESET	t-statistic	1.586920	Prob. Value	0.1349
	F-statistic	2.518316	Prob. Value	0.1349

Source: Author's computation from Eviews software, 2024

The result of the Breusch-Godfrey serial correlation LM test in Table 4 indicates that the model has evidence of no serial correlation. The absence of serial correlation in the model is inferred because the probability value (0.0612) of the Lagrange multiplier (LM) statistic (Obs*R-squared) is greater than 0.05. Further, the result shows that the Obs*R-squared value of the Breusch-Pagan-Godfrey Heteroskedasticity test is greater than 0.05; thus, suggesting that the model is free from the problem of heteroskedasticity. The result of the Ramsey RESET Test indicates that the probability value (0.1349) associated with its F-statistic is greater than 0.05. Therefore, it implies that the model is well-specified.

4.5.2. The Cumulative Sum of Squares Recursive Plot

The result of the Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) is shown in the Figure 1.

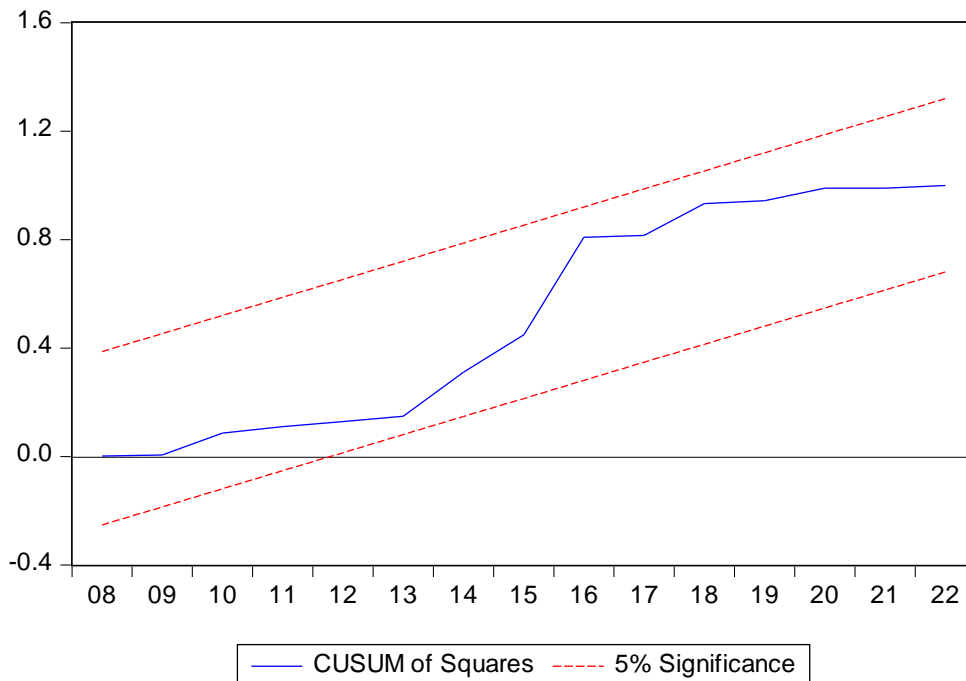


Figure 1: The Cumulative Sum of Squares Recursive Plot
Source: Authors estimation, 2024

Figure 1 shows that the CUSUMQ statistic plot is well within the critical bounds of 5 percent. This demonstrates that the ARDL estimates were accurate and consistent. The result indicates that the econometric model had structural stability because the CUSUM of Squares (blue lines) does not exceed the area between the two critical bounds (red lines).

4.6. Discussion of Findings

Given the result of the study, EXR exerted a significant negative effect on UNP in the third lag period. The economic implication is that the higher the exchange rate, the lower the rate of unemployment in the country. Traditionally, Nigeria's exchange rate appreciates with improvement in oil export, this strengthens the naira and boosts the non-traded sector which eventually clamps down on unemployment. This short run result agrees with the findings of Zahra and Mehrzad (2016). However, in the long run, EXR had a significant positive influence on UNP. This suggests that in the long-term, increase in exchanges rate will lead to increase in unemployment. In the long run, appreciation of the exchange rate can have negative impact on the export manufacturing sector as imports become cheaper. This development may lead to retrenchments and increase in the number of the unemployed. This result collaborates with the work of Atya (2017).

The findings of the study further shows that as FDI increases in the short run, unemployment reduces in Nigeria. This result agrees with the a priori expectations. A possible explanation to this

result is that foreign direct investments in Nigeria support projects investments such that when it is channeled to productive sectors of the economy, it creates new job opportunities. This result is consistent with the work of Mustafa and Azizun (2020). In contrast, the long run result showed evidence of significant positive impact of FDI on UNP. This implies that, in the long run, foreign direct investment increases the level of unemployment in Nigeria. Although this result disagrees with the a priori expectations several studies like those of Mamoon and Rahman (2016) and Biplob and Siddiquee (2024) also found a positive relationship between FDI and unemployment. Further, the significant positive impact of ODA on UNP one year ago suggests that previous occurrences in ODA is important in determining the level of unemployment in Nigeria. Although, this positive impact of ODA on UNP was reversed in the long run, the long run result was not significant. The interpretation of this result is that poor use and mismanagement of ODA in the economy will ultimately not reduce the number of unemployed people in Nigeria in the long run. The study further attributes this to institutional failure and corruption in Nigeria.

5. Conclusion and Recommendations

5.1 Conclusion

The study examined the effect of Nigeria's external sector on unemployment in Nigeria from 1985 to 2022 using the ARDL method. In light of the findings of the research study and the empirical analysis, EXR has been found to exert a mixed effect on UNP in the short run but in the long run, it achieves an increase in UNP. The study further submits that FDI significantly reduces UNP in the short run but promotes the growth of UNP in the long run. There is empirical evidence that an increase in ODA influences a significant positive increase in UNP in the short run.

5.2. Recommendations

Recommendations are made based on the conclusions drawn by this study that:

- i. The Nigerian government should make sure that measures are taken to fortify and expand institutions to prevent donor agencies' efforts to combat unemployment from being redirected or siphoned for private gain.
- ii. Economic policies that attract foreign investment and improve the investment climate should be activated in Nigeria since foreign direct investment reduces unemployment in the short term.

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